

11. Research, Education, and Economics

■ Investing in the Future Through Agricultural Research, Education, and Economics

USDA leads the world in basic and applied research, as it looks for ways to solve problems challenging America's food and fiber production system, and for ways to improve food supply, safety and quality. Five major challenges face U.S. agriculture in the next decade: (1) maintaining an agricultural system that is highly competitive in the global economy; (2) providing a safe and secure food and fiber system; (3) maintaining a healthy, well-nourished population; (4) maintaining an agricultural system that protects natural resources and the environment; and (5) increasing economic opportunities and improving the quality of life of all Americans. USDA's Research, Education, and Economics (REE) mission area helps meet these challenges.

Four USDA agencies make up the mission area: the Agricultural Research Service (ARS); the Cooperative State Research, Education, and Extension Service (CSREES); the Economic Research Service (ERS); and the National Agricultural Statistics Service (NASS). Together, these agencies have the Federal responsibility to discover and disseminate knowledge that spans the biological, physical, and social sciences related to agricultural research, economic analysis, statistics, extension, and higher education.

REE serves people along the entire food and fiber chain—from the farm gate to the consumer's kitchen table. Sound science provides new technology and information useful to Americans as well as people all over the world in their daily lives. The REE agencies develop new products and new uses, explore profitable marketing strategies, develop technologies to improve farming and processing efficiency, increase food safety, improve human nutrition, and conserve and enhance natural resources. Studies demonstrate that consumers reap the benefits of investing in agricultural research; every tax dollar invested in U.S. agricultural research has paid back at least \$1.35. Information about the REE mission and its respective agencies—ARS, CSREES, ERS, and NASS—is available on the REE World Wide Web home page at <http://www.reeusda.gov/ree/>

Agricultural Research Service

The Agricultural Research Service (ARS) is the principal in-house research agency of the U.S. Department of Agriculture.

ARS research has contributed to improved crop yields and more environmentally sensitive farming techniques. But the impact of ARS research extends far beyond the farm gate. Today's agricultural research is as much about human health as it is about growing corn.

For example, a powerful but expensive anti-cancer drug has become more plentiful, thanks to a new process developed by ARS scientists. The process makes the drug—called taxol—from lab-cultured cells of its increasingly rare natural source, the yew tree. The new process is 100 times more productive than the original process for deriving taxol, which was patented by USDA in 1991. Taxol is a potent chemotherapy drug for breast, ovarian, lung, and other cancers. Under the original process, it took about 6,700 pounds of bark from rare yew trees to make a pound of taxol.

ARS research is also as much about development of new products as it is about development of new crop varieties. One environmentally friendly product now on the market grew out of ARS research showing that adding alum to poultry litter helps reduce runoff of nutrients from the litter into groundwater and surface waterways. The alum reduces phosphorus runoff by 70 percent, reduces the litter's ammonia vapors—which can physically damage the chickens and cause respiratory problems for poultryhouse workers—and reduces heavy metal runoff such as copper, zinc, and iron by up to 50 percent. The ARS-patented technology is now used by poultry growers across the United States and in Canada.

On the crops side, a new potato variety known as AWN86514-2 is highly resistant to attack by late blight, the disease that caused the Irish potato famine of the 1840's. Late blight is caused by a fungus, *Phytophthora infestans*. New, more aggressive strains of the fungus that are fungicide-resistant have appeared in recent years, so breeders have been scrambling to find potatoes with natural resistance. The new potato held up well in tests when attacked by the newest and most virulent strains of the fungus. That's good news for consumers, because the average American eats about 143 pounds of potatoes a year, making potatoes the Nation's favorite vegetable. ARS released the new potato in collaboration with agricultural experiment stations in Oregon, Idaho, and Washington.

ARS research provides solutions to a wide range of problems related to agriculture—problems that require long-term commitment of resources or that are unlikely to have solutions with a quick commercial payoff that would tempt private industry to do the research. These problems range from fighting the ongoing battle to protect crops and livestock from costly pests and diseases, to improving quality and safety of agricultural commodities and products for humans, to making the best use of natural resources. All the while, the research results must help ensure profitability for producers and processors while keeping down costs for consumers.

National Agricultural Library

The National Agricultural Library (NAL) was established as part of the Department of Agriculture in 1862 under legislation signed by President Abraham Lincoln. Part of the Agricultural Research Service (ARS) of the U.S. Department of Agriculture, NAL is the largest agricultural library in the world with a collection of over 3.2 million items.

It is the mission of the National Agricultural Library to serve as the chief agricultural information resource of the United States, ensuring and enhancing access to agricultural information for a better quality of life.

The library serves national and international customers, including researchers, farmers, educators, policymakers, agricultural producers, and the general public. A

ARS Research: Selected Highlights

- *ARS scientists in Peoria, IL; New Orleans, LA; and Philadelphia, PA, have found a way to extract a health-enhancing oil from a waste byproduct of the corn processing industry. The scientific team started with corn fiber, a low-value byproduct of corn milling that's now sold as a low-cost ingredient in cattle feed. From that corn fiber, they've extracted an oil that, in tests with hamsters, lowered total serum cholesterol levels and LDL cholesterol, the type that clogs arteries. They've also extracted a second product from corn fiber, a white gum that could be used in a variety of products—in food as an emulsifier, a soluble dietary fiber or thickener, or industrial adhesives and water-based paint thickeners.*
- *The latest twist in alternatives to using chemical pest to combat crop pests is plants designed to give insects a stomach ache. ARS scientists teamed up with researchers at Kansas State University to insert an insect enzyme into rice plants. The enzyme—chitinase—causes digestive problems for insects that swallow it. Chitinase causes chitin, a key component in insect skin and gut tissue, to break down. In lab studies, the scientists found that the genetically engineered plants significantly suppressed the growth of feeding insect larvae. Insect chitinase in plants is harmless to humans or animals. Several agricultural biotechnology companies are working with the scientists to transform other plants, such as corn, sorghum, and wheat.*
- *ARS studies in Boston have shown that certain foods contain higher levels of compounds that could help slow the processes associated with aging in both body and brain. In the studies, eating plenty of foods with these beneficial substances, called antioxidants, raised the power of human blood to defuse harmful internal substances called oxidants by up to 25 percent. Fruits and vegetables found to have the highest amounts of these beneficial antioxidants were prunes, raisins, blueberries, blackberries, kale, strawberries, spinach, raspberries, brussel sprouts, plums and alfalfa sprouts.*
- *ARS research at the U.S. National Arboretum has yielded two new elm trees resistant to the Dutch elm disease that has ravaged the American elm population since the 1940's, wiping out an estimated 77 million trees. The two new disease-resistant elms from ARS are called Valley Forge and New Harmony. Also, ARS researchers recently unveiled two new maple trees for American streets and yards: "Red Rocket," a fiery-red maple cultivar with good pest resistance and the ability to grow where temperatures dip to 40 degrees below zero, and "New World," which also has pest and cold resistance and is an excellent shade tree as well as an ideal choice for city landscaping.*

- *ARS research on natural resources uncovered a reason to celebrate: American farmers have crossed an auspicious environmental boundary and begun reducing the level of atmospheric carbon dioxide rather than adding to it. CO₂ is one of the greenhouse gases thought to cause global warming. The ARS study showed that U.S. farmers have shifted from being net producers of carbon dioxide to net accumulators of carbon, in the form of valuable soil organic matter. The changeover was due largely to farmers' increasing use of no-till or low-till techniques. Now, many farmers leave crop residue on or near the soil surface, where the residue readily decays into organic matter.*
- *For decades, USDA has battled scrapie, a fatal brain disease of sheep and goats. Now the first preclinical, noninvasive test for scrapie should be available in a few years as a result of ARS research. Reliable diagnosis of scrapie is the first step to eradicating the disease, which would greatly improve U.S. sheep and goat export opportunities. ARS scientists discovered that the nictitating membrane, or third eyelid, in sheep collects proteins known as prions. Abnormal prions are the infectious agents believed to cause scrapie. The researchers developed a new laboratory-built molecule, called a monoclonal antibody, that detects the presence of the abnormal prions. The test will eventually allow veterinarians to detect scrapie before animals show clinical signs.*
- *For more information about ARS, see its home page:
<http://www.ars.usda.gov>*

key NAL goal is to become a “library without walls,” a library whose collection and services are available electronically throughout the world. By adapting electronic information technology to its needs, the library is well on its way to meeting this goal with worldwide accessibility over the Internet.

Over 48 miles of bookshelves hold the NAL collection. Materials in the collection include the latest electronic resources as well as books, journals, reports, photographs, films, videotapes, maps, artwork, and historic materials dating to the 16th century. Tens of thousands of new items are added each year. The collection is international in scope and includes items in nearly 75 foreign languages.

The library is located in Beltsville, Maryland, on the grounds of the ARS Beltsville Agricultural Research Center. In addition to being the agricultural library for the Nation, NAL is also the departmental library for USDA, serving thousands of USDA employees around the globe. NAL is a key resource in USDA's scientific and research activities. NAL staff includes librarians, computer specialists, information specialists, administrators, and clerical personnel. Volunteers ranging from college students to retired persons work on various programs at NAL too. The library has an active visiting scholar program as well, which allows professors, scientists, and librarians from universities worldwide to intern at NAL on projects of mutual interest.

AGRICOLA is NAL's bibliographic database providing access to the NAL collection. AGRICOLA contains nearly 3.5 million citations to agricultural literature and is available on the Internet through the NAL homepage at <http://www.nal.usda.gov>

NAL provides reference and document delivery services in all aspects of agriculture. It also includes specialized information centers that provide customized information services on topics such as alternative farming systems, animal welfare, food and nutrition, technology transfer, rural development, and water quality.

For walk-in visitors, the library is open from 8:00 a.m. to 4:30 p.m., eastern time, Monday through Friday, except Federal holidays. Many of NAL's services are available at anytime through the NAL home page.

NAL can be contacted at:

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Cooperative State Research, Education, and Extension Service

The Cooperative State Research, Education, and Extension Service (CSREES) works with universities and other public and private organizations to advance research, extension, and higher education in the food and agricultural sciences and in related environmental and human sciences. Its programs increase and provide access to scientific knowledge, strengthen the capabilities of land-grant and other science and education institutions, expand accessibility and use of improved communication and network systems, and promote informed decisionmaking.

CSREES links the research and education resources and activities of USDA, improving customer service and responsiveness to emerging issues and national priorities. CSREES programs focus on improving economic, environmental, and social conditions in the United States and globally. These conditions include improved agricultural productivity and development of new products; safer food; cleaner water and air; enhanced stewardship and management of natural resources; healthier and more responsible individuals, families, and communities; and a stable, secure, diverse, and affordable food supply.

Partnership

The CSREES domestic and international research, education, and extension networks are strengthened with partnerships that maximize resources and program impact. An array of CSREES partners includes other USDA agencies, Federal and State government departments, nonprofit organizations, and private-sector entities. Working closely with the nationwide Land-Grant University System is central to CSREES programs. CSREES partners include:

- Over 130 colleges of agriculture, including land-grant institutions in each State and territory

NAL Selected Highlights:

■ **AgNIC Growing**

The Agricultural Network Information Center (AgNIC), an agricultural information system begun in 1996 by NAL and land-grant universities, continues to show significant growth. AgNIC links worldwide agricultural information networks, providing "one-stop shopping" to anyone searching the Web for agricultural information. In Fiscal Year 1999, AgNIC received nearly 18.5 million hits.

■ **Access to Farming History Improved**

Over 200 years of U.S. farming history can now be more easily identified and accessed through NAL efforts. The USDA history collection, dating to 1862 and before, was transferred to NAL in 1998. Since then, NAL has created a web site to improve access to the collection, as well as cataloged the items and taken steps to improve preservation of the collection.

■ **Electronic Preservation Plans Developed**

NAL has taken the lead in developing plans to preserve USDA electronic publications. USDA has made electronic formats the preferred method for releasing information to the public. Preservation and long-term access of these materials are an important issue due to the ephemeral nature of electronic formats. NAL has established a steering committee and several subcommittees that are addressing the issue and formulating preservation plans and procedures.

■ **Food Safety Research Information Office Established**

NAL has established a Food Safety Research Information Office. The office, mandated by the Agricultural Research, Extension, and Education Reauthorization Act of 1998, will provide information on food safety research initiatives to the research community and the general public.

- 59 agricultural experiment stations
- 57 State or territorial cooperative extension services
- 63 schools of forestry
- 16 1890 historically black land-grant institutions, and Tuskegee University
- 27 colleges of veterinary medicine
- 42 schools and colleges of family and consumer sciences
- 30 1994 Native American land-grant institutions
- 160 Hispanic-serving institutions
- Nonprofit organizations
- the private sector

Programs

CSREES research, education, and extension leadership is provided through programs in:

- Plant and Animal Systems
- Natural Resources and Environment
- Economic and Community Systems
- Families, 4-H, and Nutrition
- Partnerships
- Competitive Research Grants and Awards Management
- Science and Education Resources Development
- Communications, Technology, and Distance Education.

What Is CSREES?

- Development of knowledge leading to advancement in agriculture, the environment, community and individual well-being through problem-focused integrated research and education and targeted scientific efforts, including cutting-edge research programs on value-added product development, plant and animal genome mapping and biotechnology, integrated pest management, water quality, human nutrition, food safety, and animal and plant systems
- Model education programs in sustainable agriculture, water quality, food safety, risk management, children and families, health, environmental stewardship, distance education, and community economic development
- Higher education programs to develop the scientific and professional expertise needed to advance the food, agricultural, and natural resource systems and maintain excellence in college and university teaching programs
- Cooperative partnerships involving:
 - over 9,600 scientists engaged in research at 59 State agricultural experiment stations, 16 1890 colleges and universities, and Tuskegee University
 - over 9,600 local extension agents working in 3,150 counties
 - 3 million trained volunteers working with national outreach education programs
 - 6.5 million youth involved in 4-H programs that increase self-esteem and enhance problem-solving skills in a positive, supportive environment
- The National Research Initiative supporting research in the biological, physical, and social sciences to solve key agricultural and environmental problems
- A Small Business Innovation Research program to support high-quality research proposals containing advanced concepts related to important scientific problems and opportunities in agriculture that could lead to significant public benefit if the research is successful
- Immediate electronic access to vital information on safety and disaster recovery during time-critical disasters, such as hurricanes, wildfires, and floods

CSREES: Selected Highlights

■ **Easing Food Fears**

Though cases of Salmonella food poisoning from eggs are rare, USDA-CSREES-funded research by Purdue, North Carolina State, and Texas A&M universities may make it nearly nonexistent. Purdue's low-temperature pasteurization process kills Salmonella on the egg shells without cooking the eggs. This process could increase the value of Indiana's egg industry alone by \$40 million. Texas A&M researchers have also reduced the incidence of Salmonella in chickens by 75 percent by boosting young chicks' immune systems in a method similar to vaccinating humans against disease.

■ **Increasing Successes and Reducing Failures**

Introducing and developing new plant varieties continues to boost the likelihood of success when farmers plant, grow, and harvest their crops. For example, USDA-CSREES has helped fund a rice breeding program at the University of Arkansas which has released 11 varieties of rice since 1980. These new varieties have increased the average yield by 1,700 pounds per acre in 1998, with an estimated value of \$88 million annually. Two recently introduced varieties, Drew and Kaybonnet, are resistant to the State's two most costly diseases. With these varieties, growers can cut production costs by as much as \$70 per acre by eliminating the need for chemical disease control.

■ **Adding Value**

Finding ways to turn trash into treasure or adding new value to familiar products often makes the competitive difference in agriculture. For example, University of Florida researchers—with research funds from USDA-CSREES—developed a breakthrough biotech bacterium that became the basis for a new ethanol plant in Louisiana. The \$90 million factory will use the patented, genetically modified bacteria to break down bagasse—an otherwise waste byproduct from sugar production—to produce ethanol. Also, a Colorado State University alternative crop specialist with support from USDA-CSREES has developed a canola-based motor oil which works just as well as the petroleum version but without the environmental drawbacks. The oil is about the same weight as 10w30, cuts hydrocarbon emissions by a third, and can be disposed of without environmental concern.

■ **Solving Local Problems Locally**

In partnership with the land-grant network of extension specialists in nearly every county linked to regional and national expertise at colleges and universities, USDA-CSREES helps citizens overcome problems and make the most of opportunities close to home. In the first year of a Louisiana State University extension energy management program for school districts, for example, participating schools saved an average of 12 percent from their energy costs, for a total of more than \$3.5 million. In New York City, a Cornell University program to improve landlord-tenant communications and promote more responsible ownership has reduced building code violations. The program is being adopted in Oregon, Mississippi, California, Massachusetts, and Colorado.

■ **Environment-Friendly Farming**

With help from USDA-CSREES and land-grant universities, farmers are modifying their practices to create greater harmony between agriculture and the environment. As competition for water increases, these farmers are finding new ways to prevent pollution and to conserve and reuse water resources. USDA and Georgia scientists and extension agents teamed up to develop an environmentally friendly cotton cropping system which increased conservation tillage in Georgia from 88,400 acres in 1994 to more than 200,000 acres in 1998. On these acres, less soil and sediments reach streams and there is more soil organic matter on the soil surface. Tennessee growers using residue management systems introduced by extension have reduced soil erosion by 20 million tons annually and sediments in streams and lakes by 10 million tons annually.

■ **Eating Well**

Despite the safety and affordability of America's food supply, diet-related diseases are all too common; poor diets and nutrition contribute to five of the 10 leading causes of death, costing the U.S. economy an estimated \$250 billion annually. To address this, USDA-CSREES and its land-grant university partners are improving the quality of the American diet and reducing health-care costs. For example, when the Food and Drug Administration recently revised its recommended daily allowance for folate or folic acid, the change was based largely upon CSREES-funded research at the University of Florida showing deficiencies in this vitamin could increase risk of anemia, birth defects, and heart disease. Since cell division depends on folate, adequate amounts of the vitamin are critical for normal fetal growth and development, while aging adults need it to repair cells. Also, Texas A&M University researchers with CSREES support found that fish oil combined with the kind of fiber found in oranges could

protect against cancer development. They also discovered a new, non-invasive way to detect changes in colon cells that may be an indicator of possible colon cancer.

■ **Working Beyond Welfare**

Programs offered by USDA-CSREES and the land-grant system are helping people move off welfare and into the job market while managing their finances and limited food dollars. Arizona extension's PHASE program, for example, has helped more than 6,000 single parents and displaced homemakers in Pima County complete their education and find jobs. The program offers job-related scholarships, job-seeking skills, and job placements. CSREES' Expanded Food and Nutrition Education Program (EFNEP) reaches low-income people with information on healthy food choices and wise use of food dollars. In Louisiana, extension reached nearly 4,000 families and more than 9,000 youth with EFNEP information. Of these, 95 percent made positive dietary changes, increasing consumption of milk, fruits, and vegetables; 48 percent said they ran out of food less often before the month's end.

■ **Managing Pests**

For more than 30 years, USDA-CSREES and its land-grant university partners have been working to develop, evaluate, and share new methods to control pests that damage crops and invade homes. New technologies and integrated pest management (IPM) strategies bring together cultural, genetic, biological, and chemical methods to effectively control insects and plant diseases with fewer pesticides, reduce crop production costs, and create a safer environment. Extension programs in Florida, Pennsylvania, Indiana, Texas, and New York, for example, are teaching school maintenance workers how to use IPM practices to reduce or eliminate pesticides in and around their schools. The number of school districts in Florida routinely spraying pesticides has dropped from 75 percent to 40 percent. Forty percent of Pennsylvania school districts also are now implementing IPM programs. In Vermont, extension specialists are helping apple growers implement IPM programs that reduce reliance on pesticides by as much as 50 percent. Apple IPM programs in Ohio, Massachusetts, New Hampshire, Virginia, and many other States are producing similar results.

■ **Water: Making the Most of Every Drop**

In finding ways to prevent pollution and improve water quality, USDA-CSREES and land-grant experts are helping farmers and others adopt practices that protect water quality and make the most of every drop. Non-point sources of pollution, such as farm fields, cause billions of dollars in damage each year. Louisiana State University

researchers and extension experts studied the movement of soil, plant nutrients, herbicides, and insecticides in surface runoff from corn and sugarcane, and taught growers how to maintain profits while reducing the amount of herbicide in Louisiana surface waters. In Nebraska, SPLASH is an extension program which teaches irrigators one-on-one how to reduce water, energy, and fertilizer use. This program has saved 46.4 million gallons of water on about 35,000 acres irrigated by cooperators.

■ **Surviving and Thriving in the Global Marketplace**

If there is one hot commodity that's already commanding a premium in the international marketplace, it's information that helps American farmers improve their bottom lines and lowers grocery bills for consumers. Research and education programs funded by USDA-CSREES are helping U.S. producers survive and thrive at a time when new trade agreements are altering the global landscape. For example, Illinois researchers have found that high-quality soybeans command higher prices in European and Japanese markets, and that some foreign buyers are now specifying oil and protein contents in their contracts. These studies provided producers with incentives to revise soybean grades for more than 60 percent of U.S. exports. An innovative cattle breeding project at Washington State University has built a herd of Wagyu cattle imported from Japan, after studies showed that the breed could be produced in the Pacific Northwest and its beef marketed in the United States and Japan at premium prices.

Economic Research Service

Food assistance programs. Climate change. Risk management. Trade liberalization. Water quality. Concentration in agricultural industries. Agricultural productivity. Nutrition. Exports of U.S. farm products. Rural population trends. Food safety concerns.

The economics of these topics and many more are analyzed by USDA's Economic Research Service (ERS), the Department's social science research agency. As such, ERS provides information and analysis that is used by public officials in developing, administering, and evaluating food, farm, conservation, and rural policies and programs, as well as by consumers, agribusinesses, and farm operators in their decisionmaking. ERS analysts monitor and evaluate many issues requiring policy decisions by the Administration and Congress.

The agency has four principal functions: research, development of economic and statistical indicators, situation and outlook analysis, and staff analysis.

ERS analyzes and monitors such areas as:

- Environmental issues.
- Nutrition education and food assistance, food safety regulation, determinants of consumer demand for quality and safety, and food marketing trends and developments.
- National and international commodity markets and production agriculture.
- The economic well-being of the rural economy, the financial performance of the farm sector, and the implications of changing farm credit and financial market structures.

ERS information is made available to the public through research publications, situation and outlook reports, e-mail and the World Wide Web, newspapers, magazines, radio, and frequent participation of ERS staff at public forums. ERS publishes several periodicals, including *Agricultural Outlook*, *FoodReview*, and *Rural America*.

The agency's products are available through a variety of formats. Printed reports can be ordered through the ERS-NASS sales desk at 1-800-999-6779. Studies, data bases, issue briefs, and other types of information are available on the ERS web site at www.econ.ag.gov and the ERS AutoFax system at 202-694-5700.

National Agricultural Statistics Service

The National Agricultural Statistics Service (NASS), "*The Fact Finders for U.S. Agriculture*," is the official data collection arm of the U. S. Department of Agriculture. The only way to "tell the story" of the phenomenal success of American agriculture is by having data available that measure productivity. Having accurate, timely information available is not only important to tell the success story of American agriculture, but it is vital to support the efficient handling of commodities in today's global market.

The NASS mission is to serve the basic agricultural and rural data needs of the people of the United States, those working in agriculture, and those living in rural communities by objectively providing important, usable, and accurate statistical information and services needed to make informed decisions.

The NASS program has successfully met many challenges over the last 138 years to provide data to meet demands from a multitude of data users. These data are geared toward producers to help them plan planting, feeding, breeding, and marketing programs. Other major uses of these statistical data include the following:

- Timely, accurate data are essential in establishing and maintaining a market place where price is determined by real facts rather than speculation and rumors.
- Sound data are needed for resolving environmental issues, rather than worst case scenarios.
- Exporters of American farm products rely on accurate information.
- Our transportation-storage industry relies on the statistics in its efforts to move agricultural products to market.
- Suppliers use the data to allocate the necessary inputs farmers need to grow their crops or raise livestock.

- Government policymakers rely on accurate data in their efforts to address natural disasters, crop insurance, and depressed farm prices.
- Other USDA agencies use the statistical data in accomplishing important programs for the Department, whether it be carrying out agricultural policy concerning farm program legislation, commodity programs, agricultural research, and rural development.

NASS headquarters is located in Washington, DC, and 45 State Statistical Offices cover more than 120 crops and 45 livestock items annually in the 50 States. Current and historical information is published in over 400 reports, which feature:

- Crop acreage, yield, production, and grain stocks;
- Livestock, dairy, and poultry production and prospects;
- Chemical use in agriculture, including post-harvest applications on selected crops;
- Labor use and wage rates;
- Farms and land in farms; and
- Prices, costs, and returns.

An abundance of agricultural information is available to data users through NASS programs. In addition to the information above, estimates on more specialized commodities, including hop stocks, mink, cherries, cranberries, hazelnuts, lentils, and peppermint oil are also available. The new nursery, equine, and aquaculture surveys have been enthusiastically endorsed by these three important industries. Most statistics are based on information gathered from producers surveyed through personal and telephone or face-to-face interviews or through mailed questionnaires. Other statistical reports are based on surveys of grain elevators, hatcheries, and other agribusinesses, as well as on administrative data such as livestock slaughter records.

Data collected from these varied sources are summarized by the NASS State offices and are sent to the agency's Agricultural Statistics Board in Washington, DC, whose members determine and issue State and national official reports.

Census of Agriculture

In 1997, NASS' statistics program was enhanced through the addition of the every 5-year census of agriculture, previously administered by the U.S. Department of Commerce's Census Bureau. This has broadened the scope of agricultural statistics available through the agency. Data from the 1997 Census of Agriculture were released electronically several months ahead of the normal release schedule on February 1 of 1999, and are now available in print, on CD-ROM, and on the Internet. In addition, following the census of agriculture release, NASS conducts special studies for aquaculture, horticulture, and irrigation. Every 10 years following the census of agriculture, NASS conducts the agricultural economics and land ownership survey which is the only source of data on agricultural land ownership, financing, and inputs by farm operators and landlords for each State.

The census is a complete accounting of U.S. agricultural production and the only source of uniform, comprehensive agricultural data for every county in the Nation. The 1997 Census of Agriculture results include data on land use and ownership, operator characteristics, crops, machinery and equipment, livestock, fertilizer, poultry, chemicals, market value of products, energy expenditures, irrigated land, production expenses, type of organization, farm programs, and corporate structure.

The NASS *Quick Facts* brochure published from the 1997 Census of Agriculture data "tells the story" of American agriculture at a glance.

How To Get More Information

All NASS reports are released at scheduled times, and the information is offered to the public in a variety of formats. The NASS table shows some methods by which NASS data can be accessed.

For More Information

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